

February 20, 2002

ISI Project No. 01-963
Report

Mr. Alan Wells
CH2M Hill
1 South Main, Suite 1400
Dayton, OH 45402

Subject: EM-61 Survey
Continental Steel Superfund Site
Kokomo, Indiana

Dear Mr. Wells:

Imaging Subsurface, Inc. (ISI) appreciates the opportunity to perform an EM-61 survey at the subject project site. The survey was performed in accordance with contract dated May 25, 2001.

SITE CONDITIONS:

The survey was performed in three distinct areas as identified by the CH2M Hill representative and in the remedial action plan. The objective of the survey was to identify potential locations where metallic debris, including underground storage tanks, was buried. The three areas were designated as Lagoon Entrance Area, Crushed Drum Area, and Drum Area. These areas are shown in **Appendix A** which includes Figures provided by CH2M Hill representative. The boundaries of the survey areas were marked in the field with paint. Initial results were transmitted to the CH2M Hill representative immediately after completing the surveys. Final results are presented in this report.

Lagoon Entrance Area

The Lagoon Entrance Area was divided into four sections. The first section begins at the road close to the fence gate and extends into the fenced area. This section was approximately 30 ft wide and 90 ft long. The survey area was covered with gravel, slag, and clayey soil.

The second section runs east-west, beginning at the tree line and ends at the sludge drying beds. This section was 40 ft wide and 145 ft long. The survey area was covered with gravel, slag, and clayey soil. A trailer was parked adjacent to the survey area in the north-central part of the survey area.

The third section runs east-west, beginning at the trailer and ends at the sludge drying beds. This section was 10 ft wide and 40 ft long. The survey area was covered with gravel, slag, and clayey soil. This section was immediately north of the second section. A part of the 0 ft grid line of second section was common with the 10 ft grid line of this section.

The fourth section also runs east-west, outside the chain-link fence. The survey area began close to the fence gate and extended towards west. This section was 5 ft wide and 160 ft long. The survey area was covered with grass and a small portion was within road pavement.

Mr. Alan Wells
CH2M Hill

Page 2

ISI Project No. 01-963

Approximate locations of these three areas are shown in Figure A of Appendix, incorporated from the remedial action plan.

Crushed Drum Area

The Crushed Drum Area was within a fenced section of the site. The survey area started adjacent to the fence line and extended towards southwest direction. The survey area was covered with slag and metallic debris, including some exposed drums, etc. The survey area was approximately 85 ft wide and 265 ft long. Some survey lines could not be completed due to excessively thick bushes and heaps of debris within the survey area. Figure B in the Appendix shows approximate location of the survey boundaries within the Crushed Drum Area. Information in Figure B is incorporated from the remedial action plan.

Drum Area

The Drum Area was in an arc shape. It was immediately close to the lagoon. A fence line was present in the middle of the survey area. The survey area was covered with gravel and bushes. The survey area was approximately 50 ft wide and 1,080 long. However, the 0,0 point of the survey was 180 ft south of the northern boundary of the area identified by the CH2M Hill representative. Therefore, the survey data extends from 0 to 900 and then a section of 0 to -180 ft was added at the end of the survey area. This makes the survey extending from -180 to +900. The survey area was curved. Therefore, to keep the error to a minimum, the longitudinal dimension was taken along the middle of the survey area. The fence was located at approximately 30 ft grid line. Therefore, no measurement was made along this grid line.

EQUIPMENT AND METHOD:

ISI used an EM-61 unit manufactured by Geonics, Ontario, Canada. The equipment was tested at the ISI office prior to mobilization to the site.

The survey was performed in the Lagoon Entrance Area on June 7 and 8, 2001. The survey at the Crushed Drum Area was performed on June 8, 2001 and survey at the Drum Area was performed on June 12, 2001. All surveys were performed along a predetermined grid pattern. The survey lines were marked at the site prior to performing the survey. The grid pattern was established running north-south and east-west within the area specified by the CH2M Hill representative. The grid lines were established at every 5-ft and the electromagnetic measurements were made at every 5-ft along the grid lines.

Electromagnetic measurements were made at two different sensors, termed as upper and lower sensors. Data were recorded in the data logger. The data were then downloaded to a computer for processing and presentation. Measurements made by the upper sensor were subtracted from the measurements made by the lower sensor. The difference is termed as residual measurements. For interpretation purposes, contour plots of the measurements from the lower sensor and the residual measurements were prepared. Both data were filtered to remove the effects of shallow and small above ground metallic objects.

Mr. Alan Wells
CH2M Hill

Page 3

ISI Project No. 01-963

RESULTS AND CONCLUSIONS:

The filtered data from the lower sensor measurements and the residual measurements are presented in **Figures 1 through 18** for the three areas.

The EM-61 data collected during the field survey were processed to filter out the effects of major surficial metallic objects. The processed data were used to prepare the contour diagrams. The difference in the secondary fields measured by two transmitters/receivers within the surveyed area are presented in a contour form in **Figures 1 through 18**.

Lagoon Entrance Area

Three significantly strong anomalies were observed in Part 1 of the Lagoon Entrance area. One anomaly was located adjacent to the fence (**Figures 1 and 2**) on east side of the gate and two small ones were close to the tree line. The amplitude, distribution and shape of these anomalies suggest the presence of small metallic objects in the subsurface. A strong residual anomaly further suggests that the anomaly is caused by a subsurface object rather than an above ground object. A pile of slag or a 55-gallon drum or a metallic object of similar size and shape would cause this type of anomalies.

Several strong anomalies were observed in the Part 2 of the Lagoon Entrance area (**Figures 3 and 4**). Three distinct anomalies were observed on the residual anomaly map. Anomaly in the northeast corner is likely to be associated with the fence gate and subsurface object as observed in **Figures 1 and 2**. The amplitude, shape and distribution of anomalies in the central part of the survey suggest that these anomalies are likely to be caused by slag material in the subsurface. A strong anomaly close to SN,100W on **Figure 3** is likely to be caused by the presence of a trailer. No major subsurface metallic object is expected in this area.

Several low gradient anomalies were observed on **Figure 6**. However, no major anomaly was observed on the Lower Sensor anomaly map for Part 3 of the Lagoon Entrance area.

One anomaly was observed in **Figure 8** that shows potential for a small metallic object in the subsurface between the fence and the road pavement. The amplitude and gradient of the lower sensor anomaly (**Figure 7**) do not suggest that this anomaly was caused by a large metallic object. Based on the information from the two anomaly maps, a small metallic object or a pile of slag may be present at 150 mark along the fence.

Crushed Drum Area

Anomalies in this area, as presented in **Figures 9 and 10**, were aligned in northeast-southwest direction, extending away from the fence line towards the elevated area. Some of the anomalies were located on top of the coal piles present within the surveyed area. However, the strong anomalies observed in the central part of the surveyed area are typical of those caused by the presence of small to medium size storage tanks. The distribution of the anomalies suggest that

Mr. Alan Wells
CH2M Hill

Page 4

ISI Project No. 01-963

majority of the metallic objects were present within the central part of the surveyed area. No metallic objects are expected to be present in the eastern corner and western corners of the surveyed area.

Drum Area

Observations in the Drum area are presented in Figures 11 through 18. The data for this area are divided into four sections. The first section (Part 1) covers observation from station -180 to station 0. The area west of the fence line was inaccessible, therefore, no data was collected there. This section was only 20 ft wide.

No significant anomaly was observed in this section (Figures 11 and 12). Some minor anomalies with very gentle gradients were observed suggesting the presence of very small conductive objects in the subsurface.

The remainder of the surveyed area was 50 ft wide. The second section (Part 2) covered from station 0 to station 300 (Figures 13 and 14). This section exhibited five anomalies at approximately at 0, 105, 165, 240, and 270 stations. Among these, anomalies at 105, 165 and 270 are worth exploring. The remaining anomalies have very gentle gradient and have smaller amplitude than those caused by USTs or drums.

The third section (Figures 15 and 16) covered observations between stations 300 and 600. Only two significant anomalies at stations 330 and 420 between lines 40 and 50 were observed in this section. Data in the remainder of the section does not suggest the presence of USTs or drums.

The fourth section (Figures 17 and 18) covered observations between stations 600 and 900. Only one significant anomaly at station 790 line 40 was observed in this section. Data in the remainder of the section does not suggest the presence of USTs or drums.

SUMMARY

An EM-61 survey was performed in three distinct areas as demarcated by the CH2M Hill representative. A grid pattern was established in each area. The grid was identified by paint marks. The boundaries of the surveyed area were demarcated in the field with paint marks with the help of CH2M Hill representative. A dual antennae system was used to perform the survey. All data were stored in a data logger attached with the equipment for downloading and interpretation. After processing of the data, contour plots were prepared and were submitted to CH2M Hill representative as preliminary information. This report contains the final plots of the interpreted data.

Based on the contour distribution, observations of the above ground features, and past experience, the EM-61 survey data collected within the Lagoon Entrance area suggest that at least six areas need additional subsurface investigation to confirm the presence of metallic objects. A large section in the central part of the Crushed Drum area would need additional

04/05/02 13:16 9372287572
02/21/2002 15:37 FAX 248 477 4738

CH2M HILL
I S I

000/023 005

Mr. Alan Wells
CH2M Hill

Page 5

ISI Project No. 01-963

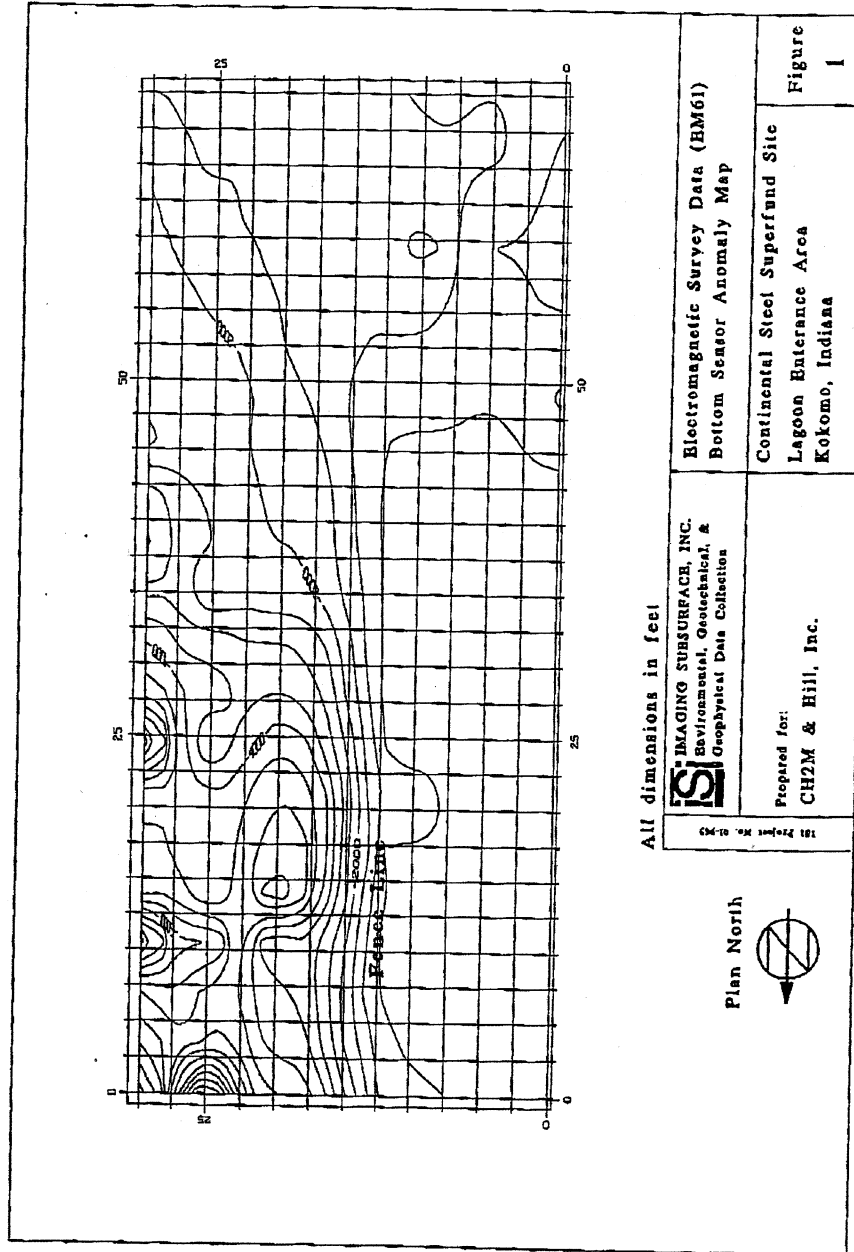
investigation. Whereas, only seven to eight locations within the drum area would need additional investigation.

ISI highly appreciates the opportunity to provide the geophysical surveying services to you. If you have any questions, please call me at (248) 426-8900.

Thank you.

Yours sincerely
IMAGING SUBSURFACE, INC.

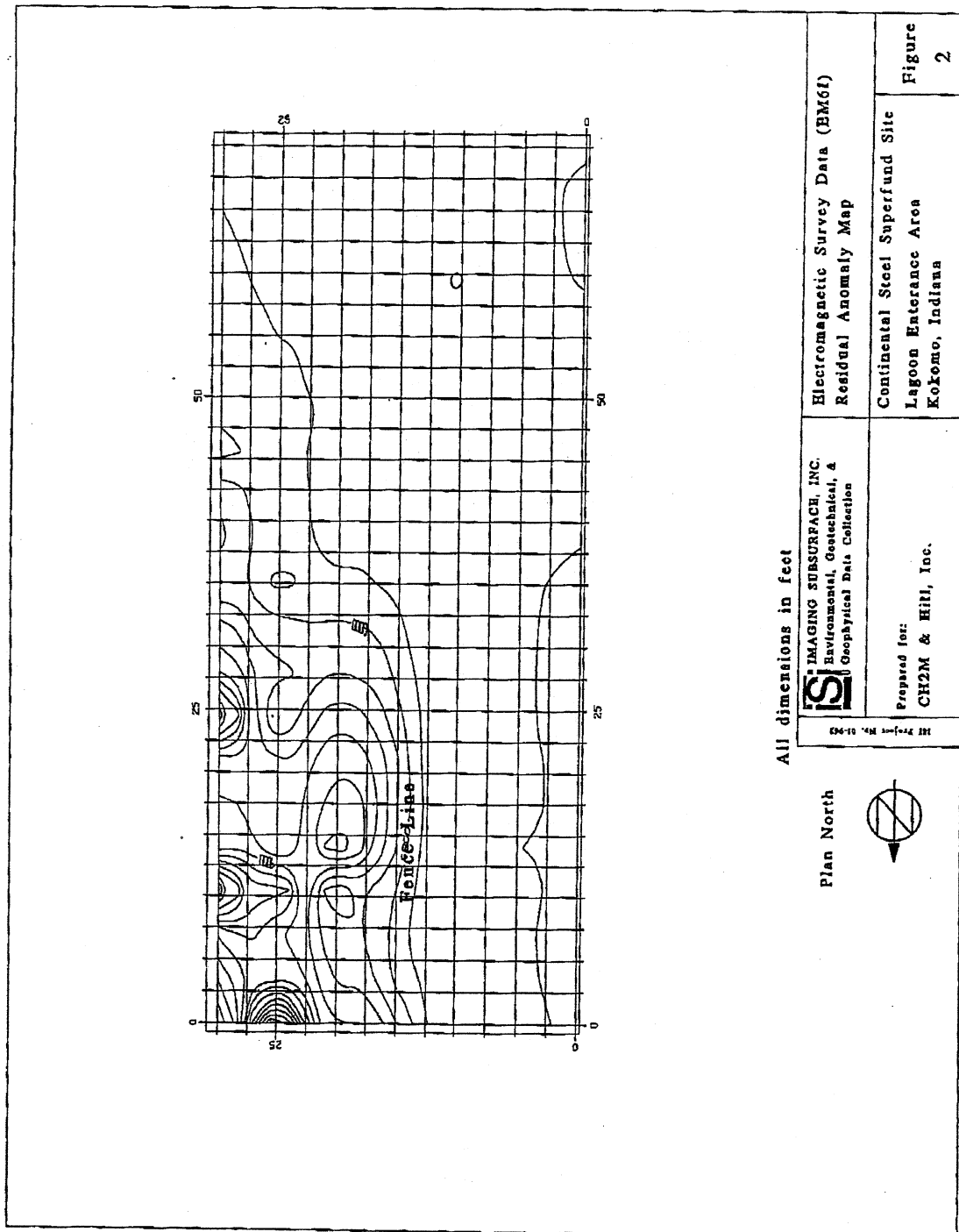
Rakesh Sarman, Ph.D., C.P.G.
Technical Director



04/05/02 13:17 9372287572
02/21/2002 15:41 FAX 248 477 4738

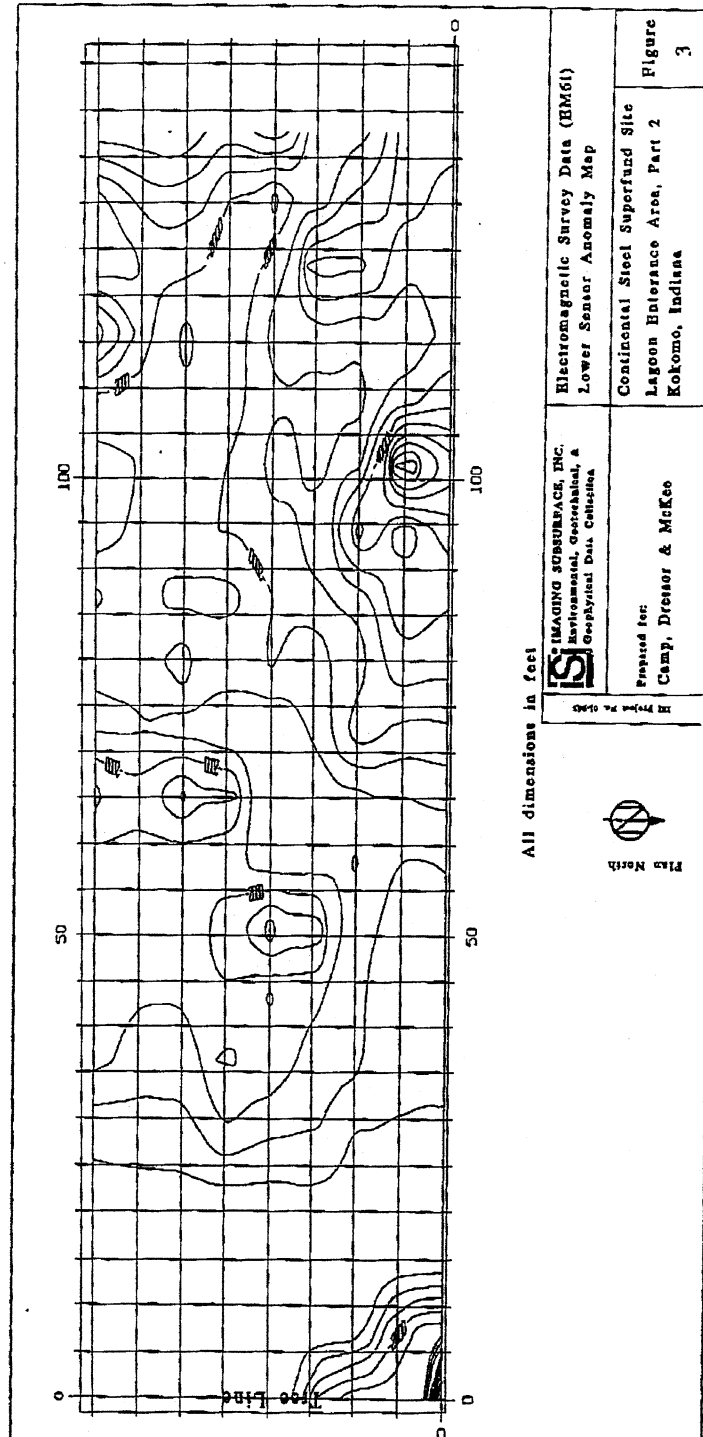
I S I CH2M HILL

007



CH2M HILL

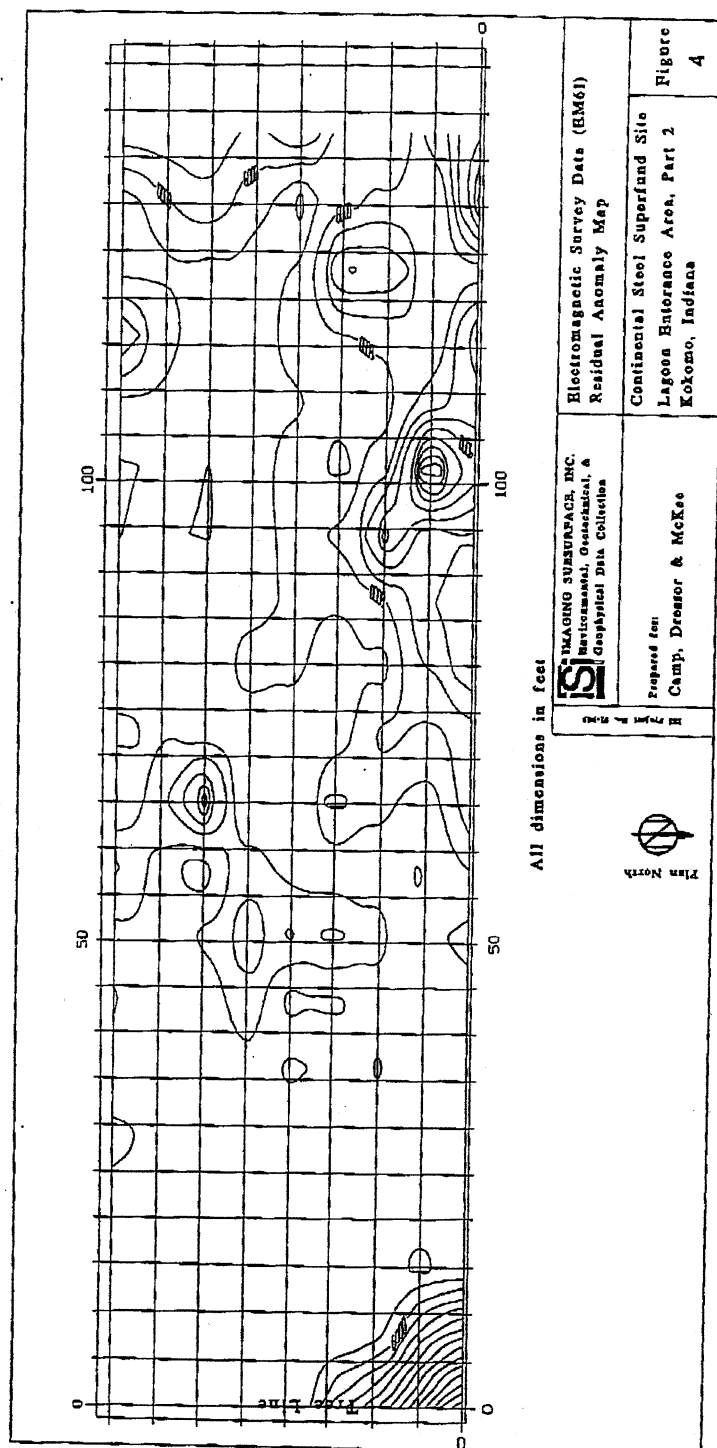
157 U 21 / 023 008

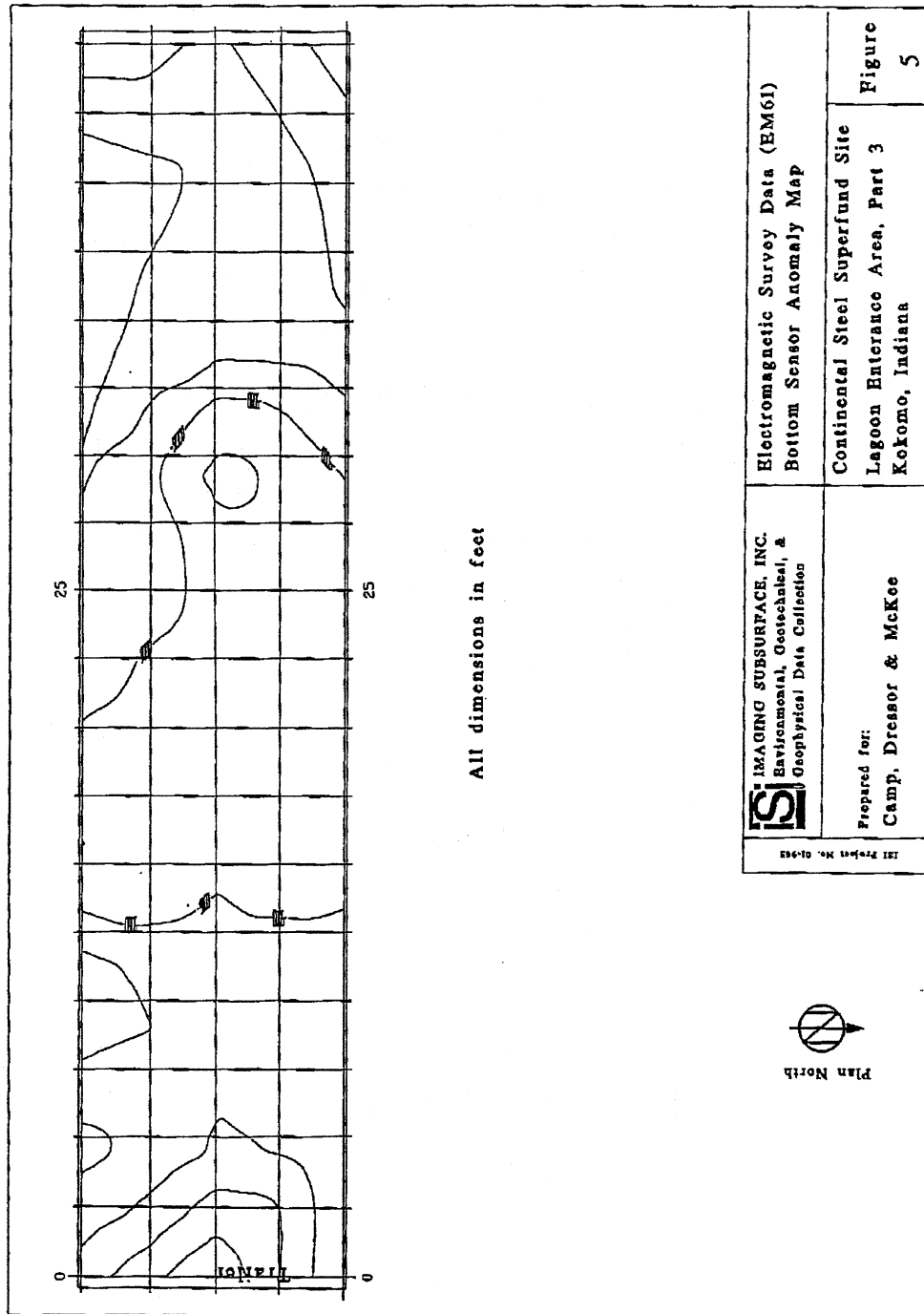


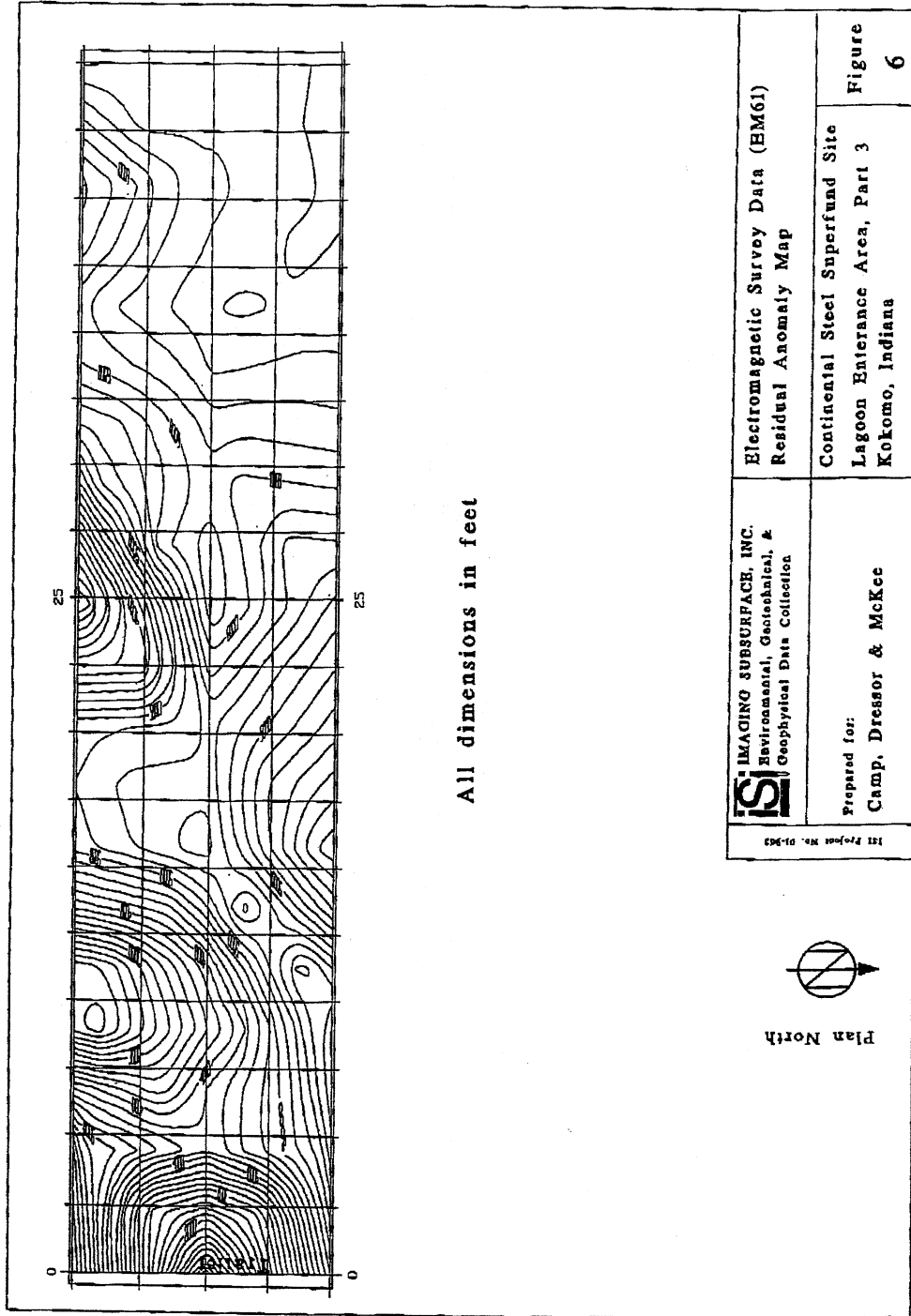
04/05/02 13:18 9372287572
02/21/2002 15:41 FAX 248 477 4738

CH2M HILL
I S I

020/023 009



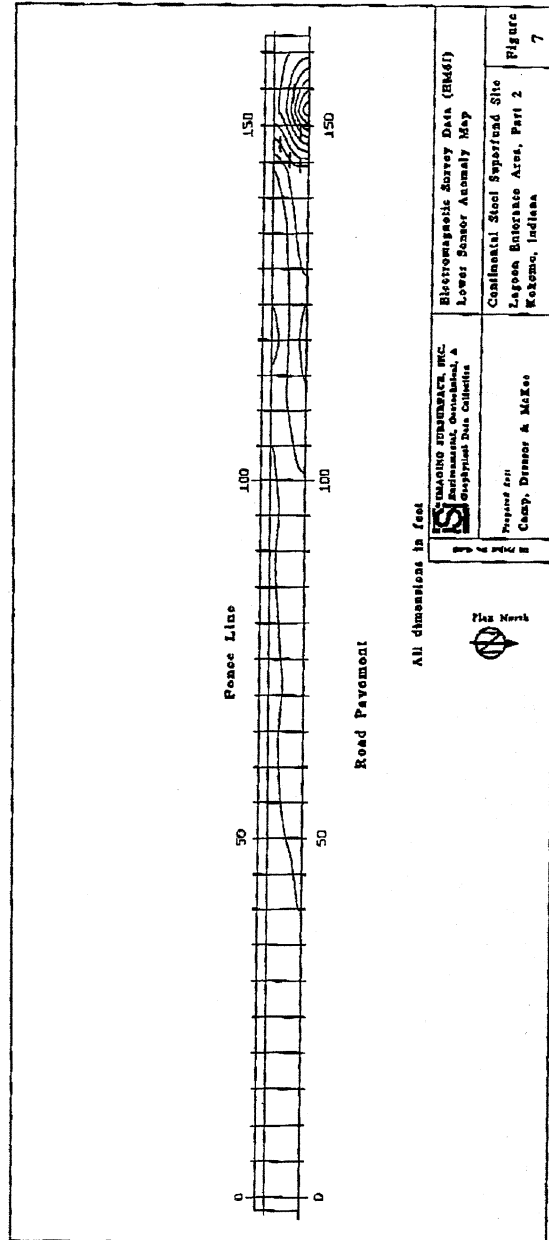


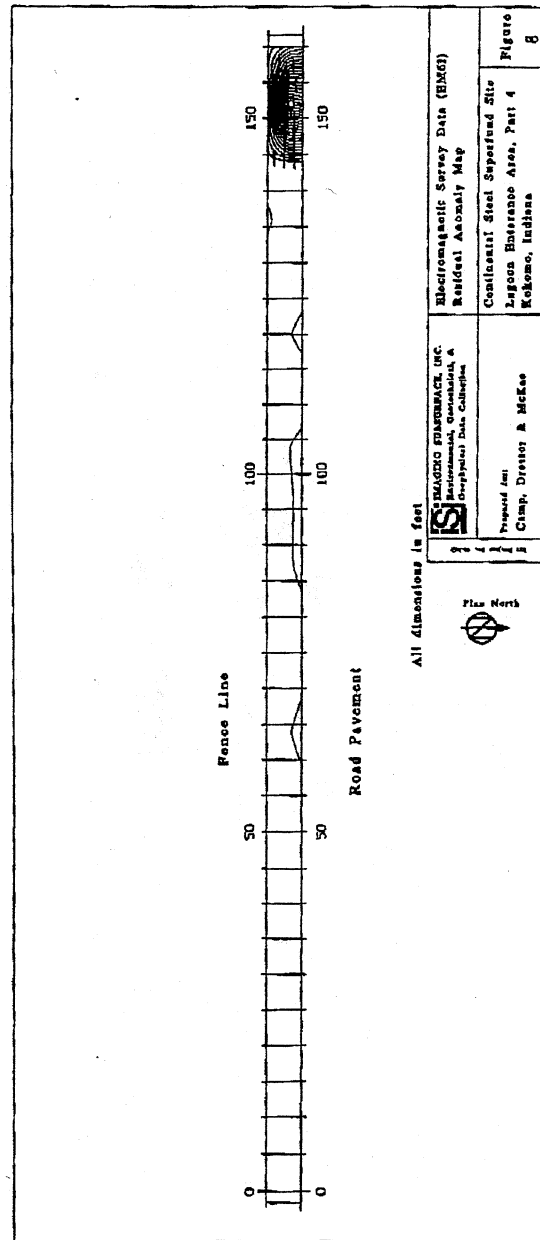


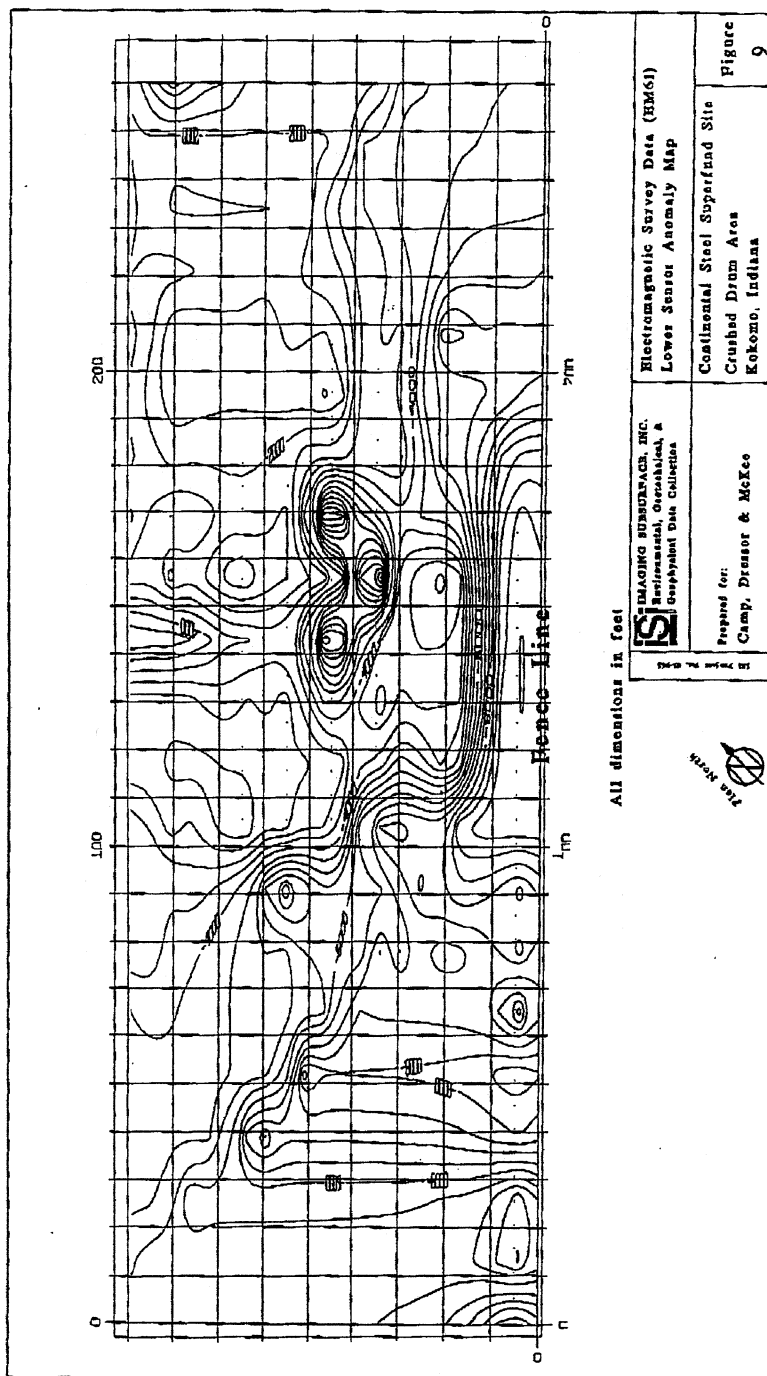
04/05/02 13:19 9372287572
02/21/2002 15:40 FAX 248 477 4738

I S I CH2M HILL

012







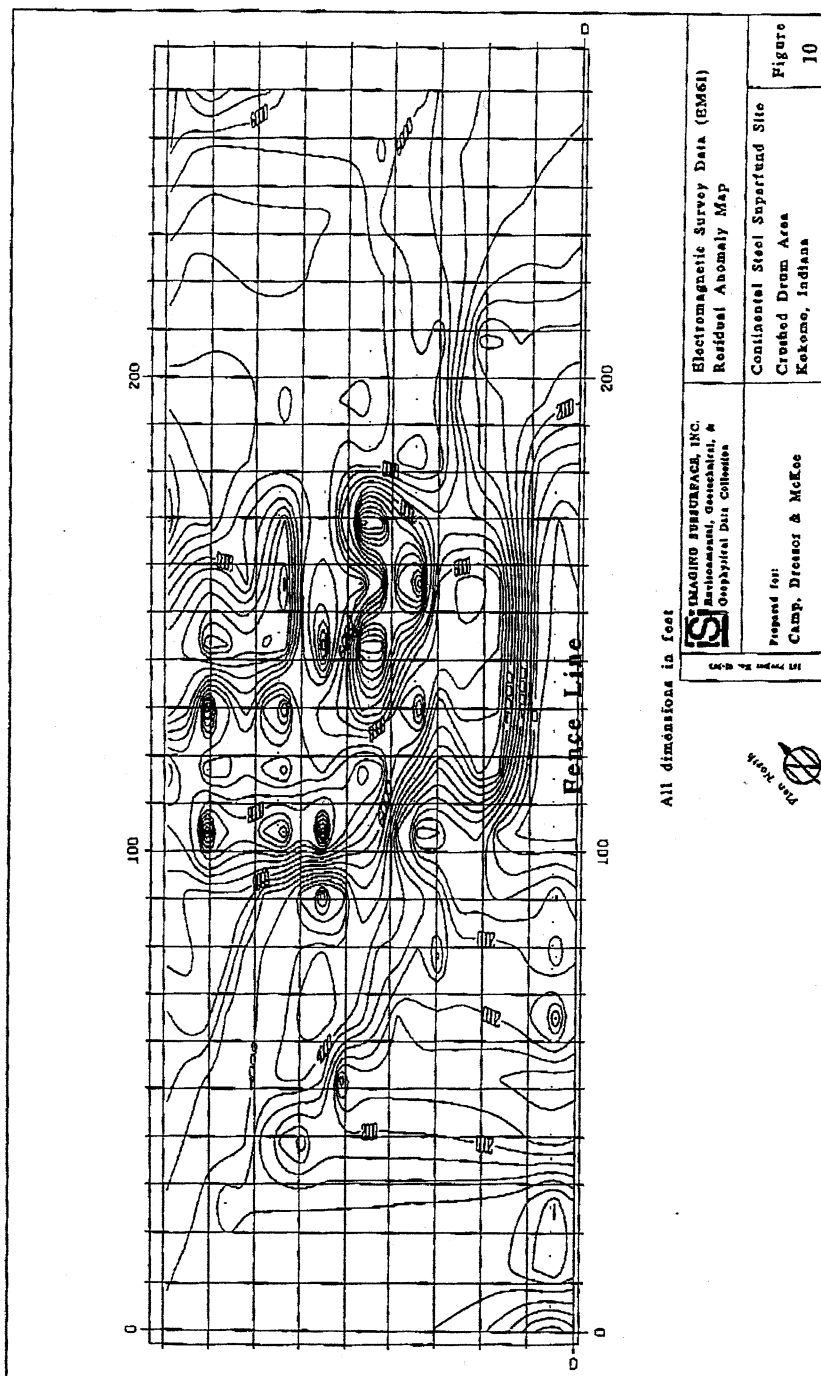
All dimensions in feet

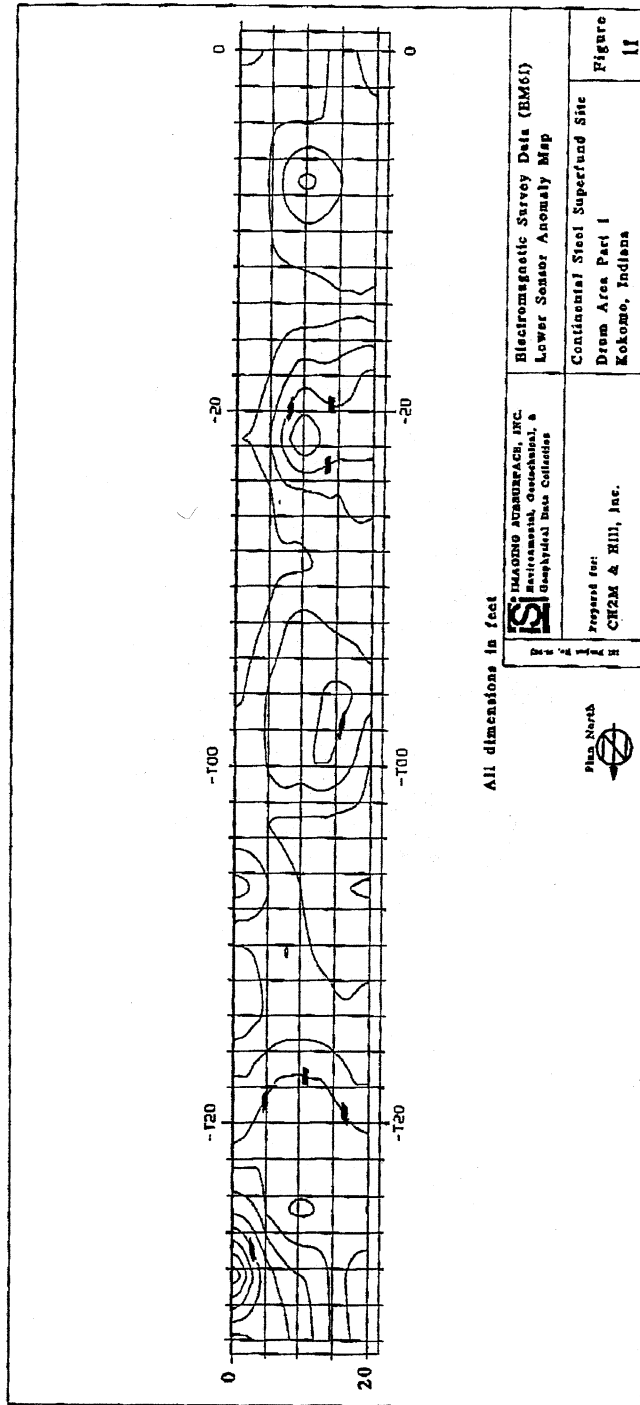
| | |
|---|---|
| <p>IMAGING SURFACER, INC. Environmental, Geophysical, & Geophysical Data Collection</p> | <p>Electromagnetic Survey Data (EMSI) Lower Sensor Anomaly Map</p> |
| <p>Prepared for: Camp, Dresser & McKee</p> | <p>Continental Steel Superfund Site Crushed Drum Area Kokomo, Indiana</p> |
| | <p>Figure 9</p> |

04/05/02 13:20 9372287572
02/21/2002 15:39 FAX 248 477 4738

CH2M HILL
I S I

014/023 015

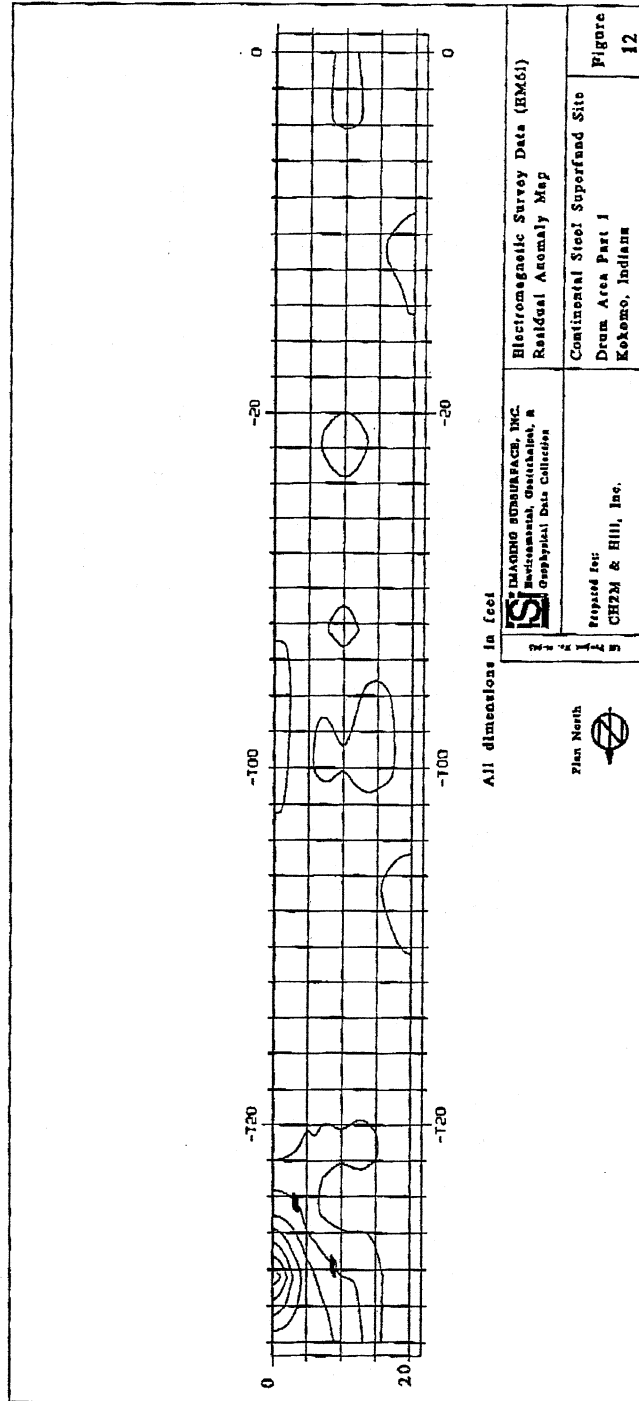




04/05/02 13:21 9372287572
02/21/2002 15:39 FAX 248 477 4738

CH2M HILL
I S I

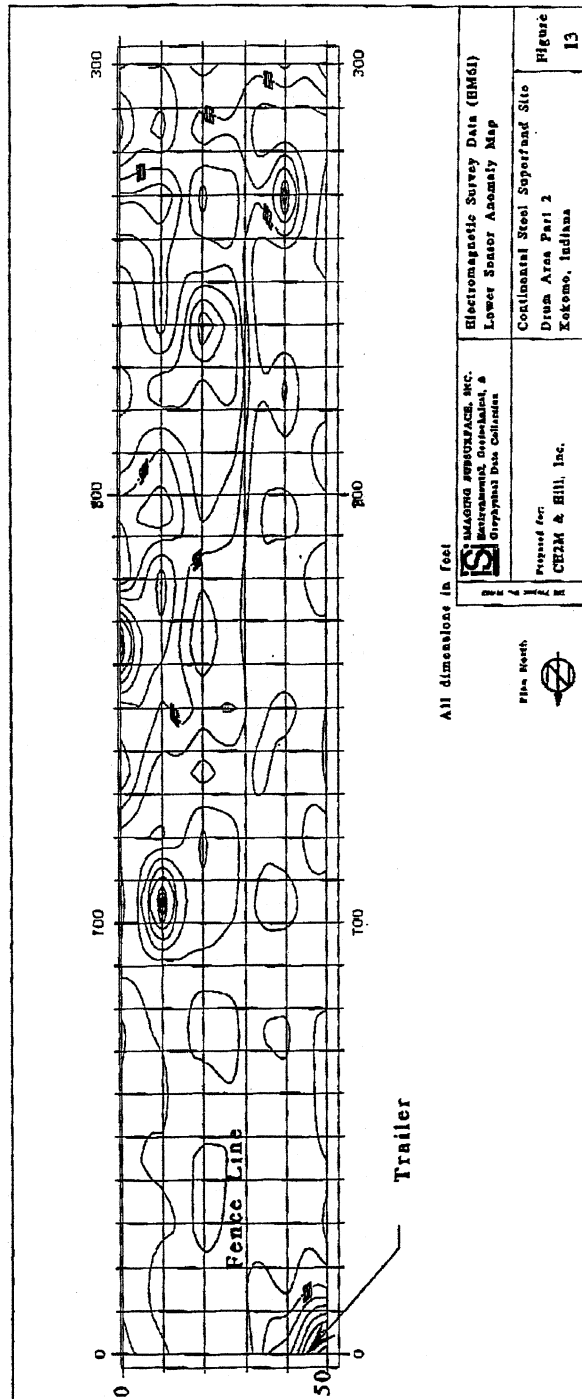
012/023 017



04/05/02 13:22 9372287572
02/21/2002 15:38 FAX 248 477 4738

CH2M HILL
I S I

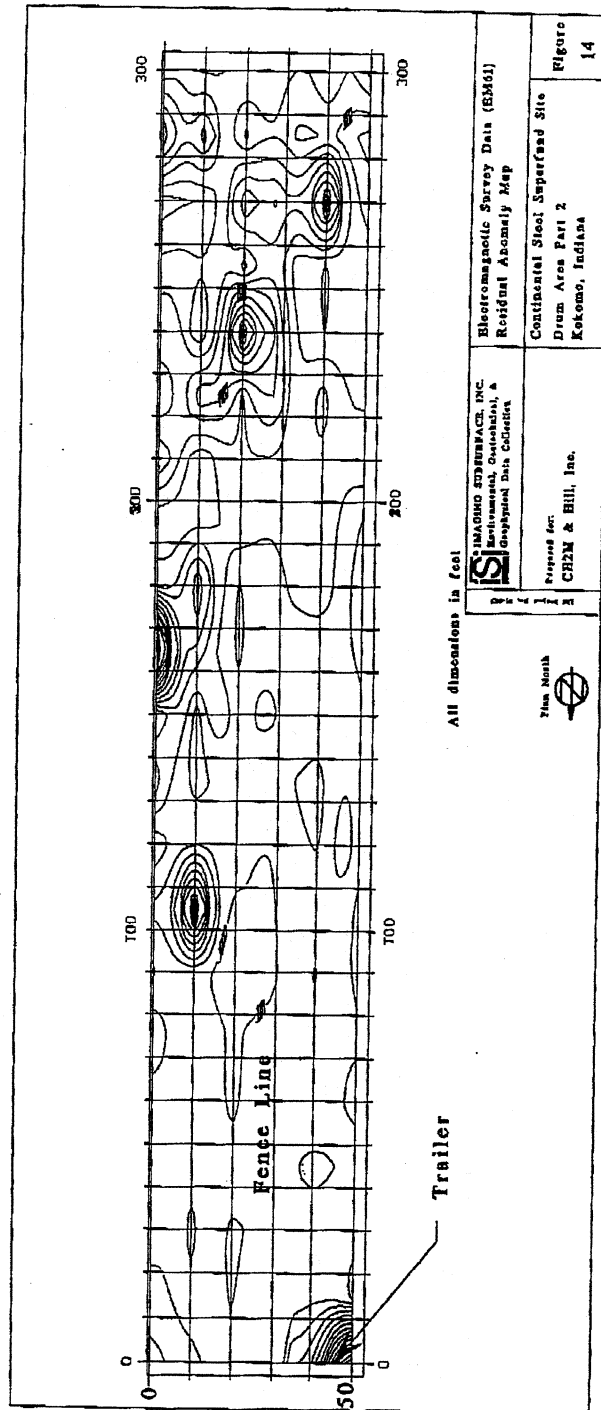
011/023 018



04/05/02 13:22 9372287572
02/21/2002 15:38 FAX 248 477 4738

I S I CH2M HILL

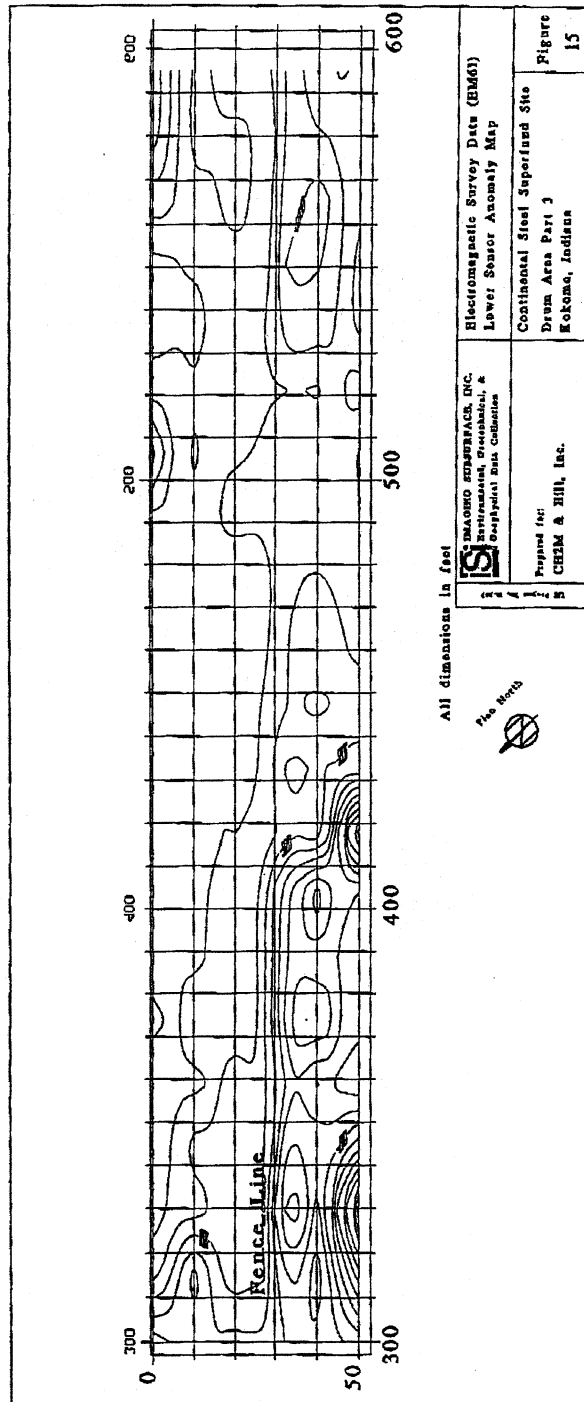
010/023 019



04/05/02 13:23 9372287572
02/21/2002 15:38 FAX 248 477 4738

CH2M HILL
I S I

009/023 020



04/05/02 13:23 9372287572
02/21/2002 15:38 FAX 248 477 4738

CH2M HILL
I S I

008/023 021

